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ABSTRACT

The pedagogical and theoretical questions raised by the notion of using microcomputers in the teaching of literature are covered in this report, rather than the current state of computer use in the classroom. In part, the report formulates basic premises that underly what teachers do in literature classrooms and asks what skills, concepts, and content are actually taught. It analyzes types of interaction between students and other students, texts, and instructors--delivered traditionally or through microcomputer--and the process by which students interpret literature. The report concludes that while microcomputers can serve as useful tools for college literature students, there is no real evidence that they can forward the core of the learning process--the process of interpretation--that defines the undergraduate study of literature. (CRH)

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Computers and Literature

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SUMMARY

In January 1984, I began to investigate possible roles for the microcomputer in R103 at Drexel University (Humanities III: Techniques of Analysis and Evaluation--the Department's introduction to the study of literature for freshmen). My investigation turned up four software packages: SEEN, Soft-Lit, Storywriter & Storyteller, and Reading in Literature. I also spoke with colleagues at the following institutions: Dartmouth, Carnegie-Mellon, Stanford, Brown, the University of Connecticut, the University of Houston, Renssalaer Polytechnic , and M.I.T. The experimental poetry course at Brown University, the most successful use of microcomputers in a literature classroom to date, was outlined in a 1979 article in Computers and the Humanities, and I examined that experiment especially closely. With software development and curricular experimentation at a variety of institutions going on apace, no report can provide any but preliminary information at this point. We cannot yet come to either a complete or a definitive appraisal of the situation. For that reason, and because some of the software packages have not yet arrived at Drexel, this report does not offer an assessment of the current software market. That aspect of the investigation--to evaluate software as it is developed and to keep abreast of activities at other universities-- will continue during spring term 1984, overseen by Dr. Raymond T. Brebach, and will, no doubt, be ongoing in the Department of Humanities and Communications.

Initially, I hoped to locate and evaluate software designed to help students develop close reading skills, understand literary forms and tropes, and ask interpretive questions when they approach a literary text.

My goal was to find models that we could adapt to suit our own teaching circumstances at Drexel. Few such programs, I found, exist. Those that do either address only formal questions about the structures and conventions of literature, a subject covered but not usually emphasized in R103 at Drexel, or approach the study of literature on a level too elementary to be appropriate for a college classroom. Other uses of

microcomputers in the teaching of literature, for example the Brown experiment, provide interactive models that purport to mimic, and enhance, classroom dialogue and instructor-student and student-student interaction, but do so in a way that itself raises questions about the function of classroom discussion for students' understanding of literature. Indeed, these programs and models point to some important problems that emerge from analyzing the possible interactions between computers and works of literature.

This report addresses, then, not the current state of microcomputer uses in classrooms, but rather the pedagogical and theoretical questions raised by the very notion of applying microcomputers to the teaching of literature. It seems to me that this notion forces us to formulate the basic premises that underly what we do in literature classrooms and to ask ourselves what it is--skills? concepts? content?--that we actually teach. We must also investigate and analyze the types of interaction--between students and instructor, between student and student, between student and text, delivered either traditionally or through a microcomputer--that occur in classrooms and their auxiliary spaces to understand the process that leads students to be able to interpret works of literature. While microcomputers can serve as useful tools for college literature students, I have concluded that there is no evidence at this time that they can usefully forward the core of the learning process--the process of interpretation--that defines the undergraduate study of literature.

In May 1984, this report will form the basis for a discussion of the Faculty Colloquium in the Department of Humanities-Communications at Drexel.

J. Epstein
April 18, 1984

COMPUTERS AND LITERATURE: A SPECULATIVE SURVEY

If, as Matthew Arnold suggested, literature is the criticism of life, then literary criticism must be a paltry, twice-removed thing indeed, hanging onto life by barely a thread. Arnold made his suggestion in 1880, in an essay entitled "The Study of Poetry," and it became part of a hot debate with Thomas H. Huxley about the relative places of literature and science in a gentleman's education. The debate was renewed, with even greater heat, when C.P. Snow proposed his "two cultures" notion in the Rede Lecture at Cambridge University in 1959. That controversy, if not quite dead, is now at least passe, but the nerve Sir Charles hit in those he dubbed the "literary intellectuals" has not yet been soothed. Indeed, that nerve--the implied charge that literary criticism is a subjective, impressionistic, unverifiable activity of the leisured class and possesses only just barely redeeming social respectability--has been pricked yet again by the full-scale entrance of computers into the hitherto ethereal realms of literary study. The most recent "literature vs. science" debate is occurring within the discipline itself, and pitting students of literature against each other. The traditionalists argue that each literary moment is unique and that tools of measurement can only distort art; the microchip revolutionaries counter that computers can analyze aspects of the literary text invisible to and unretrievable by the naked eye, and make of literary study an exact science.

Literary criticism is not so much under attack in the 1980s as it is ignored in a technological culture for which the language arts--unless they be COBOL or Pascal--seem more and more unsuited. But, prone to shifts in fashion and forever self-renewing, twentieth-century literary critics, whether they employ computer technology or not, have been at pains to assure the rest of the academic world that their work is every bit as rigorous and scientific as thin-layer chromatography. The structuralist and post-structuralist movements, for example, have produced a whole generation of critics who abandoned history and turned to the linguistic material of literature, as though poetic language were a set of mathematical symbols to be decoded or differential equations to be solved. Works as

disparate as Vladimir Propp's Morphology of the Folk-Tale (1928), Albert B. Lord's The Singer of Tales (1960), Roman Jakobson's "Linguistics and Poetics" (1960), E.D. Hirsch, Jr.'s Validity in Interpretation (1967), Roland Barthes' S/Z (1970), Gerard Genette's Narrative Discourse (1972), and Paul de Man's Allegories of Reading (1979) question the view that literature represents an idiosyncratic projection of an individual moment of imagination, and replace that view with one that holds that the literary "object" can be opened to interpretation through the interventions of a methodology of measurement and description. These critics and others question the notion that the act of reading constitutes an interactive process; rather, they hold, the reader deconstructs a linear text in its finished and inviolate graphic form, the printed page. If critics can manipulate linguistic structures and the matrices that enclose them, then they can render transparent apparently opaque subtleties of style and meaning. Although most deconstructionist critics have not themselves seriously employed computer methodologies (Roman Jacobson is an early exception), their views open the way for feeding literary texts into machines for analysis.

Several issues fundamental to the teaching of literature in the undergraduate curriculum emerge from the current uncomfortable confrontation between computer enthusiasts--makers of concordances and textual editors as well as advocates of interactive software pedagogies and on-line networking--and traditional academics. And in some ways post-structuralist critics stand, rather awkwardly, in the middle of the controversy. To uncover those issues requires first a sense of what it is that computers can do, and how those capacities have been brought to bear on works of literature. Computers analyze text--as encoders and decoders and, perhaps, as semioticians and deconstructors. But can they interpret their analyses, in the sense in which "interpretation" represents the activity of translating and communicating the divine, the cloaked tablets of the imagination in history? Computers can read particular structures. But can they also read holistically? Computers reproduce objective data accurately. But does that make them value-free, free of the taint of ideology that imprints both academic scholarship and the content and manner of classroom discussions?

Computer applications for literary study are not new; indeed, the computer's ability to remember and repeat makes it an ideal tool for a variety of reference and research activities. Computers can assemble indexes and bibliographies, prepare concordances and dictionaries, perform stylistic, syntactic, and grammatical studies. Analyzing text with a computer allows the development of tools such as frequency lists and metrical analyses, and opens the way for more complex and sophisticated applications in enterprises such as authorship determination and influence studies, translations, comparisons of variant texts, and even automatic content analysis. The usefulness of such tools cannot be disputed. These applications serve professional scholars and researchers well, and have opened the field of textual editing to a newly-technologized generation of scholars-in-training in graduate schools. Computers, then, perform for literary scholars in the same way they perform for physicists: calculations that are in themselves not necessarily interesting or significant, and that previously took hours of manual and intellectual labor to yield concrete data that then simply served the conceptual task at hand, can now be dispatched quickly, efficiently, and accurately by machines, freeing the scholar's mind for more abstract thought.

A scholar studying Petrarch's use of the phoenix image, thus, may be able to streamline the data-collection part of his or her task by using a computer; so might someone working on Flaubert's eclectic vocabulary in Bouvard et Pecuchet or a student of Conrad's subordinate clause constructions. These applications represent uses for literary scholarship as opposed to literary criticism. Petrarch, Flaubert, and Conrad scholars may go on to use the data they collect as evidence for critical assertions, but an important distinction still holds between the activities of scholarship, or data collection and analysis, and the activity of criticism, or interpretation of meaning. There are, of course, overlaps and connections: new evidence concerning the mysterious argument that resulted in Christopher Marlowe's death, for example, might affect the way in which critics read The Jew of Malta. However, that the two activities intersect--data collection hardly matters by itself unless the data yield new interpretations, and interpretations are merely speculative musings unless they can be documented--does not make them identical. So two questions about computers and literature remain. First, in what way might computers participate in (as opposed to contribute to) the critical process?

Second, to the extent that computers might forward the critical act, can they play a legitimate role in the undergraduate literature classroom, the place where interpretation of meaning and its attendant contexts takes center stage?

Some answers to these questions have been offered. In an article first published in 1966, Allan B. Ellis and F. Andre Favat cite Margaret Masterman's now well-known pronouncement that "[the] potential capacity of the digital computer to process non-numerical data in novel ways. . .is so great as to make of it the telescope of the mind" and argue that, while the computer, because it does not have simultaneous memory, cannot itself be a critic, it can be a critic's ally. Ellis and Favat tried an experiment with automatic content analysis by applying the General Inquirer program's procedures to Mark Twain's The Adventures of Huckleberry Finn. They used the tagging routine of the Psychosociological Dictionary to examine the relation between Huck and death. The death tag included terms such as *mourn, rest, autumn, separation, end, still,* and *cry,* and they applied it to all parts of the narrative spoken by Huck, both in dialogue and in first-person narration. Ellis and Favat then assembled tag-tally graphs on all their retrievals to determine the contexts in which they occurred. Their study produced a number of interesting conclusions. They found, for example, a fundamental association between death and family in the novel, and they propose that this association "may be seen as a manifestation of one of [Huck's] deepest preoccupations" (131). They also found that Huck repeatedly describes his father as animal-like. Ellis and Favat recognize the pitfalls and necessary precautions of such an approach to a text-- the researcher must be aware of particular context:

> although a general dictionary may be used for a variety of texts, the contents of each text may possess a number of distinctive aspects that make the application of a general dictionary to them inappropriate. . . .[A] new dictionary would categorize words with particular reference to the text, and in this way be conscious, for example, of words whose meanings may have been different at the time the novel was written, or which are peculiar to the text (134).

They argue that automatic content analysis "provide[s] a set of systematic procedures for obtaining data that can be transformed by the critic into evidence" and that the "computer does not usurp the critic's essential functions but, in fact, enhances them" (136). Searching a text for pre-selected words offers one method for ways in which literary scholars can collect and collate dispersed textual material in order to establish evidence.

More recently, Susan Wittig and Bruce A. Beatie each have offered theoretical discussions of what the computer provides literary study in the way of a new "telescope of the mind." Wittig focuses on the concept of text itself, and argues first, that "our perception of what constitutes a text is absolutely fundamental to our understanding of the literary experience" and second, that the predominant notions of text in computer-based literary analysis are seriously disabling (211). These notions hold that the text is a linear entity, that it is a one-time, completed work confined to the printed page, and that it is autonomous and independent, meaningful in and of itself. Such views, Wittig claims, derive from models of New Criticism and from structuralist-formalist grammar. In fact, Wittig suggests, "the experience of reading is not confined to the linear processing of text signals. . .and. . .some kinds of verbal art and some individual works are designed to subvert syntagmatic, or linear, analysis" (212). In order for computer analysis of literature to take place, computer-based critics have needed to view the text as fixed and immobile, coherent, unified, standing alone as a "perfectly finished artifact" (213). Wittig proposes, instead, a conception of the text based not on an assumption that the text is a static object, but on a dynamic conception of the text as a fluid entity that acquires meaning only in an encounter with a reader. We must, Wittig says, "turn from our analyses of the signal system of the text to a new study of how, and why, and under what conditions, the text is fulfilled with meaning by its readers" (214).

Beatie goes even further than Wittig to explain why the computer has not revolutionized, as predicted, the study of literature. Objectivity, Beatie says, resides in literary study to the extent that a work of literature is an object of study, but he cites Roland Barthes' belief that we have developed "une histoire de la litterature, mais non une science de la litterature, parce que, sans doute, nous n'avons pu encore reconnaitre pleinement la nature

de l'*objet* litteraire, qui est un objet ecrit" [We have a history of literature, but not a science of literature, no doubt because we have not yet been able to recognize fully the nature of the literary object, which is a written object] (185). For literary study to become a science, Beatie suggests, it must employ a methodology of measurement and description, something for which, it would seem, the computer is ideally suited. He traces the history of attempts to employ such a methodology, from the oral-formulaic theories of Parry and Lord to the semiotic and structuralist accounts of the text that claim Propp's work as their source to the distinction between *Erzahlzeit* (narrative time) and *erzahlte Zeit* (time of narration) drawn by Gunther Muller in 1947 as a means of analyzing narratives. These attempts have failed, Beatie argues, because while they represent hypotheses based on intuited patterns and structures, experiments to test these hypotheses have not been repeated, a required step if we are to arrive at a truly scientific theory of literature. Beatie faults literary critics for identifying too fully with the objects of their study, and cites such critics as Harry Levin, in his 1967 lecture "Why Literary Criticism is Not an Exact Science" and Jacques Barzun, in his 1974 book, Clio and the Doctors: Psycho-history, Quanto-history, and History, to support that identification. Beatie also cites Robert M. Adams, who summarizes this view of criticism as an idiosyncratic act in alliance with historical constructions of the imagination:

> Criticism, like history, is. . .a private art, one of whose conventions is that the critic shall seem to use evidence in accordance with a public code. We feel that a critical pattern has 'meaning' when it satisfies. . .prejudices; we keep the shreds of our self-respect when the conventions of demonstration are observed (190).

Beatie concludes by arguing for the necessity of separating three activities: appreciating and enjoying literature; describing and defending our mode of appreciation; and investigating and understanding literature as a phenomenon. That argument essentially insists that we separate our social and professional functions into three categories: educated, trained readers; teachers and public critics; scholars and scientists. Beatie does not, however, propose ways in which those functions might interact, or even co-exist.

These studies discuss the computer as a tool that opens texts to new access through ports hitherto unentered. They do not take up the issue of whether the computer can itself participate actively in the interpretive process. Stanley R. Petrick, in an essay entitled "Understanding Understanding Poetry," approaches that issue from the vantage point of natural language understanding systems. Petrick describes a question-answering system that uses phrase structure grammar and attempts to incorporate complex syntactic constructions while still representing underlying semantic relationships. This is not an easy task, even at IBM where Petrick worked on a system that could process questions such as "Were GM's earnings greater than IBM's in 1973?" (218) What could such a system do with Donne's "A Valediction Forbidding Mourning"? Not much, Petrick concludes; we are nowhere near producing a computer model for understanding poetry. But the simple act of asking the question produces an interesting conclusion that itself embodies a definition of poetry and the poetic process:

> Poetry can't be tied down to a single grammar which differs from a grammar of ordinary discourse in a given way, although a family of similar poems might be so characterized. Instead, the essence of poetry is to explore new ways of rule violation and rule imposition while still achieving esthetic harmony and (usually) communicating meaning or meanings (219).

In a curious way, the experimental introductory poetry course taught at Brown University several years ago by Professor Robert Scholes and two teaching assistants, Nancy Comley and James V. Catano, illustrates some of the problems raised by the theorists I have been examining. These instructors used the concept of "hypertext" to structure their poetry course. Andries Van Dam, a computer scientist at Brown, defines "hypertext" this way:

> A hypertext is a new manuscript form that consists of a computer based collection of related documents together with their cross-references, footnotes, annotations and other associations (Catano, 269).

Using this notion, the instructors surrounded each poem their students studied with a hypertext consisting of biographical material, other poems by the same poet, related poems by other poets, and a variety of critical articles. Such materials, Catano points out, are the obvious context within which other poetry courses also operate, but the difference here rests in the fact that all reading and displaying of material occurred at a CRT terminal whose screen could be divided into four windows. "This capacity of the screen," writes Catano, "would reinforce the idea of the poem as the center of a web of interconnected materials" (270). Students read the poem in one window, then used the system's capacities to call other selected materials into the remaining windows. Students were not required, as they are by many computer programs, to proceed in any particular order or at any predetermined speed through the materials, except insofar as the session parameters dictated. In the first session, they read only the poem. In the second session, biographical information and other poems were added. In the final session for each poem, critical articles entered the hypertext. As they read, each student entered his or her comments and responses and questions. They could also read comments written by other students as well as responses to the students' comments entered by the instructors. Several assumptions underly this arrangement. First, the instructors wanted to break down students' notion that any written text is inviolable, that it is an object that cannot be manipulated. This course emphasized "the idea of a malleable text" (273). In its place, the course reinforced the perception of poetry as a process completed by readers. Meaning appeared as a function of the communal process of reading and responding to the materials at hand, of which the original poem was the center. Classroom lectures and discussion derived from the "communal text" that was concurrently developing on-line. Catano claims that the computer both increased and enhanced classroom interaction when students and instructors encountered each other face to face instead of on-screen. Indeed, he argues, "[a]ll of the time spent by the instructor on-line can be seen as a type of delayed direct contact between instructor and student, and between the instructor and the class as a whole" (275).

Many investigators who write about the uses of computers for teaching literature also insist on the notion of interactivity emphasized by Catano and his colleagues at Brown. Elaine McNally Jarchow has developed a software package for teaching literature that consists of a series of

"open-ended" multiple-choice questions designed to help each student draw inferences from facts and that, she proposes, will "engage every student in a level of inquiry which might be lacking in a general classroom discussion"(36). Helen J. Schwartz has designed a program that prompts students to devise character analyses by establishing a hypothesis (for example,"Cordelia is spoiled"), then testing it against evidence from the text. An Electric Bulletin Board allows students to sign their responses with pen names and share them with the class; at subsequent sessions with the computer, students might alter or refine their comments in response to the reactions of their classmates. Schwartz postulates that this "provides an audience component to help the student refine ideas and sharpen critical skills" (1982, 148). Many popular software packages also employ "interactivity." Programmed fiction such as the computer "novels" produced by Infocom require the "reader" to participate for their very existence. In *Deadline*, for example, the "reader" becomes the detective who questions a bevy of murder suspects at a country estate. Both printed fiction--John Barth in the United States, John Fowles in England, Michel Butor and Nathalie Sarraute in France, for example--and film (think of Bunuel) have employed reader-participator theories in slightly more venerable media, so participatory computer fictions are not as radically innovative as they first appear. But the very notion of "interactivity" reveals an underlying assumption about literature, an assumption that would please reader-response critics such as Hans-Robert Jauss, Wolfgang Iser and Stanley Fish: both reading and works of literature are processes, and they come into being only when text and reader meet. Ironically, the computer's capacity to engage a user in dialogue seems unrelated to the machine's own analytic skills.

An odd tenet implicit in the Brown course and in other interactive computer teaching situations is that, not only is each individual student's developing understanding a process, but so are two other things, the developing understanding[s] of a group of students considered collectively, and the coming-into-being for the class of the text it is studying. The Brown students did not simply read Blake's "The Sick Rose"; according to Catano, in some sense they also wrote it. The "communal text," then, represents not merely the tissue of contexts and responses that surround and are elicited by a work of literature, but a wholly new text generated by a group process. The students create the poem together, then understand it together. This activity suggests a radically new approach

because the conception of the nature of a work of literature proposed by the course's methodology differs utterly from traditional classroom views. That computers have entered the scene and their screens have replaced blackboards signals this shift, but only incidentally. The literary text no longer exists as an aesthetic or historical or cultural artifact. Rather, the poem becomes as the students read it; it contains what they put into it. Meaning turns into a social construct: the poem itself is an empty vessel; students pour meanings into it.

The capacity of computers to undertake accurate, controlled formal analysis, helpful as it is for graduate students and professional scholars, offers only peripheral use for introductory undergraduate literature courses. Students might use concordances to help them find supporting evidence for their thesis that, say, Antony and Brutus do not mean the same thing by the word "honor" in Julius Caesar, but they are unlikely themselves to make concordances. A computer program could help students learn to differentiate between Shakespearean and Spenserian sonnets, but that distinction would probably not anchor a semester-long poetry course. Formal analysis--learning to recognize and differentiate between iambic pentameter and heroic couplets, *style indirect libre* and interior monologue--has a place, and an important one, in a student's introduction to literature, but since the demise of philology in the curriculum, most instructors of literature focus not on form, or at least not on form *per se*, but on meaning. Computer prompts and screen interactions with other students and instructors purport to engage students directly in the production of meaning through the text, and formal analysis represents only one small part of this endeavor.

How does this machine-mediated engagement and text production or interpretation-production differ from what occurs in a classroom discussion? Proponents of interactive computer technologies as aids for teaching literature would not deny that a process of communication holds a fundamental place in their enterprise. Why else praise the machine's capacities to moderate dialogues between literary text and reader, between student and instructor, and between student and fellow student[s]? Does machine-modulated communication differ from a broader-based, more populous discussion that might occur in a traditional classroom? Formally, the machine frees discussion participants from certain constraints: embarrassment or awkwardness about public speaking (many computer

proponents offer the view that shy students thrive in these circumstances); concern about being "wrong" or about public criticism; inability to edit or revise opinions before uttering them. Machine-mediated communication of this sort unfolds slowly--a period of up to a week might pass before all participants have the opportunity to respond to all aspects of the material under discussion. This slow-motion response time precludes spontaneity. More than that, the computer depersonalizes the classroom situation, which, for better or for worse, has traditionally been controlled by the manner and personality of an individual instructor and a particular group of students. If the machine makes all individual responses to a given set of materials equal, a laudable effect in itself, it also neutralizes the excitement of face-to-face interaction that many of us remember brought us into this profession in the first place. Where, for example, are the jokes, the asides, the vociferous debates, the collective moments when a text comes alive and sings?

The act of interpreting literature brings together a variety of skills, from simple reading comprehension to knowledge about the history and formal conventions of a particular genre to the ability to draw analogies. But interpretation also engages less tangible intellectual and moral capacities, the capacities to evaluate and, ultimately, to judge. The computer, even if it uses subtle, sophisticated software that may prompt students to consider moral and aesthetic judgments, cannot itself perform the function of judge. It can only support the effort of judgment and interpretation by organizing evidence. Northrop Frye elaborates the problem well in the "Polemical Introduction" to his Anatomy of Criticism:

> What if criticism is a science as well as an art? Not a 'pure' or 'exact' science, of course, but these phrases belong to a nineteenth-century cosmology which is no longer with us. . . .The presence of science in any subject changes its character from the casual to the causal, from the random and intuitive to the systematic, as well as safeguarding the integrity of that subject from external invasions. . . .[T]he difficulty often felt in 'teaching literature' arises from the fact that it cannot be done: the criticism of literature is all that can be directly taught. Literature is not a subject of study, but an object of study. . .(Princeton, 1957, 7-11)

Frye's distinction between literature and criticism serves well to illuminate the pedagogical dilemmas associated with the literature classroom. Matthew Arnold made a similar distinction in 1857, in an essay entitled "On the Modern Element in Literature," when he argued that the artist's job consists of "synthesis and exposition, not of analysis and discovery." The teacher's role, as the critic's, is to uncover the marriage between linguistic material and aesthetic texture locked into the text, to analyze and discover the artist's synthesis and exposition. That process always represents an unveiling, and in our classrooms we try to initiate students into the secrets of a magician's hat trick. The trick can be studied systematically, and taught, and learned, because behind every trick lies an explanation, sometimes even an explanation with a scientific basis. But in the performance, it remains a trick.

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